Sequence protocols
0

0
5 <110> Prof. Dr. Flügge, Ulf-Ingo

0

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<120> DNA-sequence coding for a glucose-translocator
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Plasmids, bacteria, yeast and plants containing
0   said transporter

0
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0
<130> plastidic glucose transporters

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<150> S652952
<151> 1999-06-13

25 <160> 6

<170> PatentIn Ver. 2.1

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tcg tgg agc ggc gat cgg aga ttg ccg gcg gtc aac ccc tgc agc gtg 97
Ser Trp Ser Gly Asp Arg Arg Leu Pro Ala Val Asn Pro Cys Ser Val
          20   25   30

cgg atg ccg acg ggc aac gat ggg tgg tgc gcc ggc ctg agg tcg cgg 145
Arg Met Pro Thr Gly Asn Asp Gly Trp Cys Ala Gly Leu Arg Ser Arg
        35   40   45

gcg gcg gat ctc gcc ggc ctc gag atg gcc aac ctg cgc ggc ggc gtc 193
Ala Ala Asp Leu Ala Gly Leu Glu Met Ala Asn Leu Arg Gly Gly Val
      50   55   60

ggg ggg ctc ttc cgc gcg agc ccg cgc tac ggg cgc ttg caa gcc acg 241
Gly Gly Leu Phe Arg Ala Ser Pro Arg Tyr Gly Arg Leu Gln Ala Thr
  65   70   75   80

gcg gca gtt gac cct gaa gat att cca ttg gag aag gtt caa gtt aaa 289
Ala Ala Val Asp Pro Glu Asp Ile Pro Leu Glu Lys Val Gln Val Lys
        85   90   95

tcc tca gga cat gtt ctg cca tat gtt ggc gtt gct tgt ttg ggg gct 337
Ser Ser Gly His Val Leu Pro Tyr Val Gly Val Ala Cys Leu Gly Ala
        100   105   110

att ctg ttt ggt tac cat ctt ggt gtg gtc aat ggc gca ctt gaa tat 385
Ile Leu Phe Gly Tyr His Leu Gly Val Val Asn Gly Ala Leu Glu Tyr
      115   120   125

ctc gcg aag gat ctt ggg att gct gaa aat gct gtc ttg cag ggg tgg 433
Leu Ala Lys Asp Leu Gly Ile Ala Glu Asn Ala Val Leu Gln Gly Trp

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                    130                        135                        140

        gtg gtt agc aca tcc ttg gct ggt gca aca cta ggt tct ttt act ggg    481
        Val Val Ser Thr Ser Leu Ala Gly Ala Thr Leu Gly Ser Phe Thr Gly
5   145                    150                        155                    160


        ggt tct ttg gca gat aaa ttt ggg cgg aca aga aca ttc atc ctg gat    529
        Gly Ser Leu Ala Asp Lys Phe Gly Arg Thr Arg Thr Phe Ile Leu Asp
                        165                        170                    175

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        gca gtc cca ctt gct cta ggt gca ttc ttg agt gca aca gct caa gat    577
        Ala Val Pro Leu Ala Leu Gly Ala Phe Leu Ser Ala Thr Ala Gln Asp
                            180                        185                    190


15  atc cgc aca atg att att ggc cga ttg ctt gct gga att ggt atc ggg        625
        Ile Arg Thr Met Ile Ile Gly Arg Leu Leu Ala Gly Ile Gly Ile Gly
                    195                        200                        205


        gtc tca tct gct ctt gta ccc ctt tac ata tct gag atc tca cca act    673
20  Val Ser Ser Ala Leu Val Pro Leu Tyr Ile Ser Glu Ile Ser Pro Thr
                    210                        215                        220


        gaa att cgt gga aca ctt ggt acc gtt aat caa ctt ttt att tgc att    721
        Glu Ile Arg Gly Thr Leu Gly Thr Val Asn Gln Leu Phe Ile Cys Ile
25  225                        230                        235                    240


        gga att ctt gca gct ttg tta gct gga ttg cct ctg gca gga aat cct    769
        Gly Ile Leu Ala Ala Leu Leu Ala Gly Leu Pro Leu Ala Gly Asn Pro
                        245                        250                        255

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        gcc tgg tgg agg aca atg ttt gga att gct gta gtt cca tcc att ctg    817
        Ala Trp Trp Arg Thr Met Phe Gly Ile Ala Val Val Pro Ser Ile Leu
                        260                        265                        270


35  ctg gct gta gga atg gcc ttt tcg cct gaa agc cct cgt tgg cta ttc        865
        Leu Ala Val Gly Met Ala Phe Ser Pro Glu Ser Pro Arg Trp Leu Phe
                    275                        280                        285
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cag caa gga aag gtt act caa gca gaa tta gct gta aaa aga ctg tat   913
Gln Gln Gly Lys Val Thr Gln Ala Glu Leu Ala Val Lys Arg Leu Tyr
    290   295   300

5 gga aaa gaa atg gtt acc gaa att atg ttt gat ctg aga gct agt ggc   961
Gly Lys Glu Met Val Thr Glu Ile Met Phe Asp Leu Arg Ala Ser Gly
  305   310   315   320

caa agt tct tcg gag tcc gaa gcc ggc tgg ttt gat ctt ttc agc aag   1009
10 Gln Ser Ser Ser Glu Ser Glu Ala Gly Trp Phe Asp Leu Phe Ser Lys
              325   330   335

cgt tac tgg aaa gtt gtg agt gtg ggg gca gca ctg ttt ttg ttc cag   1057
Arg Tyr Trp Lys Val Val Ser Val Gly Ala Ala Leu Phe Leu Phe Gln
15   340   345   350

cag ctt gct ggt ata aac gct gtt gta tat tac tct aca tcg gtg ttc   1105
Gln Leu Ala Gly Ile Asn Ala Val Val Tyr Tyr Ser Thr Ser Val Phe
              355   360   365

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cgt agt gca ggc att gca tct gat gtt gct gct agt gct ctt gtt gga   1153
Arg Ser Ala Gly Ile Ala Ser Asp Val Ala Ala Ser Ala Leu Val Gly
    370   375   380

25 gca gcc aat gtt ttt ggt act atg gtt gca tct tct cta atg gac aaa   1201
Ala Ala Asn Val Phe Gly Thr Met Val Ala Ser Ser Leu Met Asp Lys
  385   390   395   400

caa gga agg aaa agc ctt ctg ata aca agc ttt tct gga atg ggt gct   1249
30 Gln Gly Arg Lys Ser Leu Leu Ile Thr Ser Phe Ser Gly Met Gly Ala
              405   410   415

tca atg cta ctc cta gca ttg tcc ttc acc tgg aaa gct ctg gca cct   1297
Ser Met Leu Leu Leu Ala Leu Ser Phe Thr Trp Lys Ala Leu Ala Pro
35   420   425   430

tat tct ggt act ctt gct gtt gtt ggc act gtt ctg tac gtg ctg tca   1345
Tyr Ser Gly Thr Leu Ala Val Val Gly Thr Val Leu Tyr Val Leu Ser

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                435                    440                   445


    ttt gct cta gga gcg ggc cct gtt cca gcg cta ctt ctt cct gaa ata   1393
    Phe Ala Leu Gly Ala Gly Pro Val Pro Ala Leu Leu Leu Pro Glu Ile
5       450                   455                   460


    ttt gcc tcg aga ata agg gcc aag gct gtc gca tta tct cta ggc atg   1441
    Phe Ala Ser Arg Ile Arg Ala Lys Ala Val Ala Leu Ser Leu Gly Met
    465                   470                   475                   480
10
    cac tgg gta tct aac ttt ttc att ggc ctg tac ttc ctg agt gtc gtg   1489
    His Trp Val Ser Asn Phe Phe Ile Gly Leu Tyr Phe Leu Ser Val Val
                      485                   490                   495


15 agc aag ttt ggg atc agc aac gtg tat ctg gga ttt gca tca gta tgt   1537
    Ser Lys Phe Gly Ile Ser Asn Val Tyr Leu Gly Phe Ala Ser Val Cys
                 500                   505                   510


    gcc ctt gca gtt ctg tac ata gct ggg aat gtg gtc gag acc aag ggg   1585
20 Ala Leu Ala Val Leu Tyr Ile Ala Gly Asn Val Val Glu Thr Lys Gly
            515                   520                   525


    aga tca ctt gaa gag att gaa agg gag cta agt gta gca gaa tga       1630
    Arg Ser Leu Glu Glu Ile Glu Arg Glu Leu Ser Val Ala Glu
25     530                   535                   540


    tgtactttg ctagtcatgc tgtggcgccg ttttggttat cgagaatgca accaagcgct 1690


    caaccgagca tccttggacc tggagactct ttctagtttc atgtagtttt agaaataagc 1750
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    gaacggcaag agtaccaatc ttaggtgact ggtgtgggt tgtgtctgaa ataagtgaat 1810


    tggattgtag aatttcagaa ataagtgaat tggattgtag aatttcaaaa aaaaaaaaaa 1870


35 aaaa                                                                1874
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    Arg Met Pro Thr Gly Asn Asp Gly Trp Cys Ala Gly Leu Arg Ser Arg
                35                  40                  45

15 Ala Ala Asp Leu Ala Gly Leu Glu Met Ala Asn Leu Arg Gly Gly Val
        50                  55                  60

    Gly Gly Leu Phe Arg Ala Ser Pro Arg Tyr Gly Arg Leu Gln Ala Thr
    65                  70                  75                  80
20
    Ala Ala Val Asp Pro Glu Asp Ile Pro Leu Glu Lys Val Gln Val Lys
                    85                  90                  95

    Ser Ser Gly His Val Leu Pro Tyr Val Gly Val Ala Cys Leu Gly Ala
25              100                 105                 110

    Ile Leu Phe Gly Tyr His Leu Gly Val Val Asn Gly Ala Leu Glu Tyr
                115                 120                 125

30 Leu Ala Lys Asp Leu Gly Ile Ala Glu Asn Ala Val Leu Gln Gly Trp
            130                 135                 140

    Val Val Ser Thr Ser Leu Ala Gly Ala Thr Leu Gly Ser Phe Thr Gly
    145                 150                 155                 160
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    Gly Ser Leu Ala Asp Lys Phe Gly Arg Thr Arg Thr Phe Ile Leu Asp
                165                 170                 175
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Ala Val Pro Leu Ala Leu Gly Ala Phe Leu Ser Ala Thr Ala Gln Asp
            180   185   190

Ile Arg Thr Met Ile Ile Gly Arg Leu Leu Ala Gly Ile Gly Ile Gly
5   195   200   205

Val Ser Ser Ala Leu Val Pro Leu Tyr Ile Ser Glu Ile Ser Pro Thr
            210   215   220

10 Glu Ile Arg Gly Thr Leu Gly Thr Val Asn Gln Leu Phe Ile Cys Ile
   225   230   235   240

Gly Ile Leu Ala Ala Leu Leu Ala Gly Leu Pro Leu Ala Gly Asn Pro
            245   250   255

15
Ala Trp Trp Arg Thr Met Phe Gly Ile Ala Val Val Pro Ser Ile Leu
            260   265   270

Leu Ala Val Gly Met Ala Phe Ser Pro Glu Ser Pro Arg Trp Leu Phe
20   275   280   285

Gln Gln Gly Lys Val Thr Gln Ala Glu Leu Ala Val Lys Arg Leu Tyr
            290   295   300

25 Gly Lys Glu Met Val Thr Glu Ile Met Phe Asp Leu Arg Ala Ser Gly
   305   310   315   320

Gln Ser Ser Ser Glu Ser Glu Ala Gly Trp Phe Asp Leu Phe Ser Lys
            325   330   335

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Arg Tyr Trp Lys Val Val Ser Val Gly Ala Ala Leu Phe Leu Phe Gln
            340   345   350

Gln Leu Ala Gly Ile Asn Ala Val Val Tyr Tyr Ser Thr Ser Val Phe
35   355   360   365

Arg Ser Ala Gly Ile Ala Ser Asp Val Ala Ala Ser Ala Leu Val Gly
            370   375   380

Ala Ala Asn Val Phe Gly Thr Met Val Ala Ser Ser Leu Met Asp Lys
385   390   395   400

5 Gln Gly Arg Lys Ser Leu Leu Ile Thr Ser Phe Ser Gly Met Gly Ala
                    405   410   415

Ser Met Leu Leu Leu Ala Leu Ser Phe Thr Trp Lys Ala Leu Ala Pro
                    420   425   430

10
Tyr Ser Gly Thr Leu Ala Val Val Gly Thr Val Leu Tyr Val Leu Ser
                435   440   445

Phe Ala Leu Gly Ala Gly Pro Val Pro Ala Leu Leu Leu Pro Glu Ile
15   450   455   460

Phe Ala Ser Arg Ile Arg Ala Lys Ala Val Ala Leu Ser Leu Gly Met
465   470   475   480

20 His Trp Val Ser Asn Phe Phe Ile Gly Leu Tyr Phe Leu Ser Val Val
                    485   490   495

Ser Lys Phe Gly Ile Ser Asn Val Tyr Leu Gly Phe Ala Ser Val Cys
                500   505   510

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Ala Leu Ala Val Leu Tyr Ile Ala Gly Asn Val Val Glu Thr Lys Gly
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1               5                   10                  15


gat gca gca cct ctc aaa gtt caa ggc caa tca tct gga tca gta ctt      96
Asp Ala Ala Pro Leu Lys Val Gln Gly Gln Ser Ser Gly Ser Val Leu
            20                  25                  30


ccc tat gtg ggt gta gct tgt ctg gga gca att tta ttt gga tat cac     144
Pro Tyr Val Gly Val Ala Cys Leu Gly Ala Ile Leu Phe Gly Tyr His
        35                  40                  45


cta ggg gtg gtg aat ggt gcc ctt gag tac cta gct aag gat ctt gga     192
Leu Gly Val Val Asn Gly Ala Leu Glu Tyr Leu Ala Lys Asp Leu Gly
    50                  55                  60


att gcc gag aac act gtt ata caa gga tgg att gtt agc aca gtt ctt     240
Ile Ala Glu Asn Thr Val Ile Gln Gly Trp Ile Val Ser Thr Val Leu
65                  70                  75                  80


gct ggc gcc ttt gtt ggt tca ttt act ggt gga gtt ctg gct gat aaa     288
Ala Gly Ala Phe Val Gly Ser Phe Thr Gly Gly Val Leu Ala Asp Lys
                85                  90                  95


ttt ggc cga aca aag aca ttt ata ttg gat gca att cca ctt tca gtt     336
Phe Gly Arg Thr Lys Thr Phe Ile Leu Asp Ala Ile Pro Leu Ser Val
            100                 105                 110


ggt gcg ttt cta tgt acc act gcc cag agt gtt cag gct atg atc att     384
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    Gly Ala Phe Leu Cys Thr Thr Ala Gln Ser Val Gln Ala Met Ile Ile
        115              120              125
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    gga cgc tta ctt act gga att ggc att ggc atc tca tct gct att gtg      432
  5 Gly Arg Leu Leu Thr Gly Ile Gly Ile Gly Ile Ser Ser Ala Ile Val
        130              135              140
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    cca ctt tac ata tct gag atc tca ccc act gaa att cgc ggc aca ctg      480
    Pro Leu Tyr Ile Ser Glu Ile Ser Pro Thr Glu Ile Arg Gly Thr Leu
 10 145              150              155              160
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    gga acg gtc aat cag cta ttc att tgc att gga att ctt gtt gca ctc      528
    Gly Thr Val Asn Gln Leu Phe Ile Cys Ile Gly Ile Leu Val Ala Leu
                     165              170              175
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 15
    gtg gtt gga ttg cct ttg tct gga aat cct tcg tgg tgg aga aca atg      576
    Val Val Gly Leu Pro Leu Ser Gly Asn Pro Ser Trp Trp Arg Thr Met
                     180              185              190
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 20 ttt ggt ctc gca ctt att cca tct gtt tta ctt gca ata gga atg gca      624
    Phe Gly Leu Ala Leu Ile Pro Ser Val Leu Leu Ala Ile Gly Met Ala
        195              200              205
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    ttt tct cct gaa agt cct cgg tgg ctc tat cag caa ggg aga att tct      672
 25 Phe Ser Pro Glu Ser Pro Arg Trp Leu Tyr Gln Gln Gly Arg Ile Ser
        210              215              220
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    gaa gct gag aca tct att aaa agg cta tat ggt aaa gaa aaa gtt gct      720
    Glu Ala Glu Thr Ser Ile Lys Arg Leu Tyr Gly Lys Glu Lys Val Ala
 30 225              230              235              240
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    gag gtt atg ggt gac ttg gaa gct tct gcc cgg ggt tct tca gaa cca      768
    Glu Val Met Gly Asp Leu Glu Ala Ser Ala Arg Gly Ser Ser Glu Pro
                     245              250              255
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 35
    gat gct ggg tgg ctt gat cta ttt agt agc cgt tat agg aaa gtt gtt      816
    Asp Ala Gly Trp Leu Asp Leu Phe Ser Ser Arg Tyr Arg Lys Val Val
        260              265              270
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agc att ggt gca gct atg ttc ttg ttg cag cag ttg gct ggg ata aat   864
Ser Ile Gly Ala Ala Met Phe Leu Leu Gln Gln Leu Ala Gly Ile Asn
            275   280   285

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gct gtt gtc tat tat tcc act gcc gtg ttc cgg agt gct gga att aca   912
Ala Val Val Tyr Tyr Ser Thr Ala Val Phe Arg Ser Ala Gly Ile Thr
            290   295   300

10 tct gat gta gca gcc agt gct ctg gtt gga gca gcc aac gtc ttt ggg   960
Ser Asp Val Ala Ala Ser Ala Leu Val Gly Ala Ala Asn Val Phe Gly
305   310   315   320

aca acg gtg gca tcc tct ttg atg gac aaa caa gga agg aag agt ctc   1008
15 Thr Thr Val Ala Ser Ser Leu Met Asp Lys Gln Gly Arg Lys Ser Leu
                325   330   335

ttg ctc ata agc tat act gga atg gct gca tca atg atg ttg ctt tcc   1056
Leu Leu Ile Ser Tyr Thr Gly Met Ala Ala Ser Met Met Leu Leu Ser
20   340   345   350

ttg tca ttc act tgg aag gtc ctg act cca tat tct ggc aca ctg gct   1104
Leu Ser Phe Thr Trp Lys Val Leu Thr Pro Tyr Ser Gly Thr Leu Ala
                355   360   365

25

gtt ctt ggt act gtc ctc tat gtg ttg tcc ttt tca ctt ggt gct ggt   1152
Val Leu Gly Thr Val Leu Tyr Val Leu Ser Phe Ser Leu Gly Ala Gly
        370   375   380

30 cct gtg cct gct ctt cta ctt cca gaa ata ttt gct tcc aga att agg   1200
Pro Val Pro Ala Leu Leu Leu Pro Glu Ile Phe Ala Ser Arg Ile Arg
385   390   395   400

gca aaa gcg gtg gct ctc tct ttg ggg gta cat tgg ata atg aac ttc   1248
35 Ala Lys Ala Val Ala Leu Ser Leu Gly Val His Trp Ile Met Asn Phe
                405   410   415

ttt att ggc ctg tac ttc ttg agc att gta act aaa ttt ggt atc agt   1296

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Phe Ile Gly Leu Tyr Phe Leu Ser Ile Val Thr Lys Phe Gly Ile Ser
          420                   425                   430


acg gtg tac atg gga ttt gca ctc tct tgt ctt gtt gct gtc gtg tat    1344
Thr Val Tyr Met Gly Phe Ala Leu Ser Cys Leu Val Ala Val Val Tyr
          435                   440                   445


ata act ggt aat gtc gtg gag aca aag ggg cgg tca ctg gag gag ata    1392
Ile Thr Gly Asn Val Val Glu Thr Lys Gly Arg Ser Leu Glu Glu Ile
          450                   455                   460


gaa cgt gag tta agt cca gca att tga gtggtacaac atgaacagct           1439
Glu Arg Glu Leu Ser Pro Ala Ile
465                   470


gagagtaatt tcagattccg ccatccagtg ggtcttgatt ttgaagagat tctccacatt   1499


gggagttcta ttattgcgag actggagttg catcacttac cctttagcta tctctttgat   1559


tttcttgtac gtcggcatca tgaatcatgg aacattgtaa aaacatgtaa ctgttatgga   1619


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          35                  40                  45
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Leu Gly Val Val Asn Gly Ala Leu Glu Tyr Leu Ala Lys Asp Leu Gly
      50   55   60

5 Ile Ala Glu Asn Thr Val Ile Gln Gly Trp Ile Val Ser Thr Val Leu
      65   70   75   80

Ala Gly Ala Phe Val Gly Ser Phe Thr Gly Gly Val Leu Ala Asp Lys
                  85   90   95

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Phe Gly Arg Thr Lys Thr Phe Ile Leu Asp Ala Ile Pro Leu Ser Val
                  100   105   110

Gly Ala Phe Leu Cys Thr Thr Ala Gln Ser Val Gln Ala Met Ile Ile
15   115   120   125

Gly Arg Leu Leu Thr Gly Ile Gly Ile Gly Ile Ser Ser Ala Ile Val
         130   135   140

20 Pro Leu Tyr Ile Ser Glu Ile Ser Pro Thr Glu Ile Arg Gly Thr Leu
      145   150   155   160

Gly Thr Val Asn Gln Leu Phe Ile Cys Ile Gly Ile Leu Val Ala Leu
                  165   170   175

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Val Val Gly Leu Pro Leu Ser Gly Asn Pro Ser Trp Trp Arg Thr Met
                  180   185   190

Phe Gly Leu Ala Leu Ile Pro Ser Val Leu Leu Ala Ile Gly Met Ala
30   195   200   205

Phe Ser Pro Glu Ser Pro Arg Trp Leu Tyr Gln Gln Gly Arg Ile Ser
         210   215   220

35 Glu Ala Glu Thr Ser Ile Lys Arg Leu Tyr Gly Lys Glu Lys Val Ala
      225   230   235   240

Glu Val Met Gly Asp Leu Glu Ala Ser Ala Arg Gly Ser Ser Glu Pro

245   250   255

Asp Ala Gly Trp Leu Asp Leu Phe Ser Ser Arg Tyr Arg Lys Val Val
          260   265   270

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Ser Ile Gly Ala Ala Met Phe Leu Leu Gln Gln Leu Ala Gly Ile Asn
          275   280   285

Ala Val Val Tyr Tyr Ser Thr Ala Val Phe Arg Ser Ala Gly Ile Thr
10   290   295   300

Ser Asp Val Ala Ala Ser Ala Leu Val Gly Ala Ala Asn Val Phe Gly
305   310   315   320

15 Thr Thr Val Ala Ser Ser Leu Met Asp Lys Gln Gly Arg Lys Ser Leu
                325   330   335

Leu Leu Ile Ser Tyr Thr Gly Met Ala Ala Ser Met Met Leu Leu Ser
          340   345   350

20
Leu Ser Phe Thr Trp Lys Val Leu Thr Pro Tyr Ser Gly Thr Leu Ala
          355   360   365

Val Leu Gly Thr Val Leu Tyr Val Leu Ser Phe Ser Leu Gly Ala Gly
25   370   375   380

Pro Val Pro Ala Leu Leu Leu Pro Glu Ile Phe Ala Ser Arg Ile Arg
385   390   395   400

30 Ala Lys Ala Val Ala Leu Ser Leu Gly Val His Trp Ile Met Asn Phe
                405   410   415

Phe Ile Gly Leu Tyr Phe Leu Ser Ile Val Thr Lys Phe Gly Ile Ser
          420   425   430

35
Thr Val Tyr Met Gly Phe Ala Leu Ser Cys Leu Val Ala Val Val Tyr
          435   440   445

Ile Thr Gly Asn Val Val Glu Thr Lys Gly Arg Ser Leu Glu Glu Ile
     450   455   460

Glu Arg Glu Leu Ser Pro Ala Ile
465   470

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Met Gln Ala Ser Thr Phe Met Val Lys Gly Asn Leu Gly Phe Glu Val
  1   5   10   15

cag aac cgt aga gtg gct ggg ctt gct ggg ttg aaa ggg tta agc tca   156
Gln Asn Arg Arg Val Ala Gly Leu Ala Gly Leu Lys Gly Leu Ser Ser
        20   25   30

atc cgt tcc aat aat cta agt ttt gtg aat gtt aat gac aat aat tat   204
Ile Arg Ser Asn Asn Leu Ser Phe Val Asn Val Asn Asp Asn Asn Tyr

16

                    35   40   45

     aag tct aat ccc tgt aaa ttg agt tgt ggg tcc ctt tcg atg ggt gct   252
     Lys Ser Asn Pro Cys Lys Leu Ser Cys Gly Ser Leu Ser Met Gly Ala
5   50   55   60

     gga ttt gca aga ttg ggt ctt gat cat gtc atg aag tcc tca ccc aag   300
     Gly Phe Ala Arg Leu Gly Leu Asp His Val Met Lys Ser Ser Pro Lys
          65   70   75   80
10
     tac aga tca gtc aag gct caa gct gct tct gga gga gat ctt gaa gat   348
     Tyr Arg Ser Val Lys Ala Gln Ala Ala Ser Gly Gly Asp Leu Glu Asp
                         85   90   95

15   gcc act cct gtc aaa tat caa ggc aaa tct tct gca tca gtg ttg ccg   396
     Ala Thr Pro Val Lys Tyr Gln Gly Lys Ser Ser Ala Ser Val Leu Pro
                    100   105   110

     tat gtt ggt gtt gct tgt ttg gga gct att ttg ttt gga tat cac ctt   444
20   Tyr Val Gly Val Ala Cys Leu Gly Ala Ile Leu Phe Gly Tyr His Leu
                    115   120   125

     ggt gtg gta aat gga gct ctt gac tac cta tct gcg gat tta gct att   492
     Gly Val Val Asn Gly Ala Leu Asp Tyr Leu Ser Ala Asp Leu Ala Ile
25   130   135   140

     gct ggc aat act gtt tta caa gga tgg gtt gtg agc ata tta ctt gct   540
     Ala Gly Asn Thr Val Leu Gln Gly Trp Val Val Ser Ile Leu Leu Ala
     145   150   155   160
30
     gga gcg act gta ggt tca ttt act ggc gga tct ttg gct gat aag ttt   588
     Gly Ala Thr Val Gly Ser Phe Thr Gly Gly Ser Leu Ala Asp Lys Phe
                    165   170   175

35   gga agg aca aag acc ttc cag tta gat gca att cct ctt gca ata gga   636
     Gly Arg Thr Lys Thr Phe Gln Leu Asp Ala Ile Pro Leu Ala Ile Gly
                    180   185   190

17

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   gct tat ctc tgt gcc aca gca caa aat gta cag ata atg atg att ggt    684
   Ala Tyr Leu Cys Ala Thr Ala Gln Asn Val Gln Ile Met Met Ile Gly
            195             200             205

 5 cgt tta ctt tgt ggc att gga att ggc ata tca tct gcc tta gtt ccg    732
   Arg Leu Leu Cys Gly Ile Gly Ile Gly Ile Ser Ser Ala Leu Val Pro
            210             215             220


   tta tac att tct gag att tcg cca act gaa att cga ggt gca ctt ggt    780
10 Leu Tyr Ile Ser Glu Ile Ser Pro Thr Glu Ile Arg Gly Ala Leu Gly
   225             230             235             240


   tct gtc aac cag ctt ttt ata tgc att ggt att ctt gcg gct ttg gtt    828
   Ser Val Asn Gln Leu Phe Ile Cys Ile Gly Ile Leu Ala Ala Leu Val
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   gct gga ttg cct tta gca gga aac cct ttg tgg tgg agg aca atg ttt    876
   Ala Gly Leu Pro Leu Ala Gly Asn Pro Leu Trp Trp Arg Thr Met Phe
                260             265             270
20
   ggt att gca aca gtt ccc tct gtt ctc ttg gct ctt ggg atg ggc ttc    924
   Gly Ile Ala Thr Val Pro Ser Val Leu Leu Ala Leu Gly Met Gly Phe
            275             280             285


25 tgt cca gaa agc cct agg tgg ctt ttt cag caa gga aaa att gtt gaa    972
   Cys Pro Glu Ser Pro Arg Trp Leu Phe Gln Gln Gly Lys Ile Val Glu
            290             295             300


   gca gaa aag gcc gta gca gcc ctc tat gga aaa gaa agg gtt ccg gag   1020
30 Ala Glu Lys Ala Val Ala Ala Leu Tyr Gly Lys Glu Arg Val Pro Glu
   305             310             315             320


   gtg att aat gat ttg aga gca tct gtt caa ggt tct tct gaa cca gaa   1068
   Val Ile Asn Asp Leu Arg Ala Ser Val Gln Gly Ser Ser Glu Pro Glu
35              325             330             335


   gct ggc tgg ttt gat ctg ttc agt agc cgc tac agg aaa gtg gta agt   1116
   Ala Gly Trp Phe Asp Leu Phe Ser Ser Arg Tyr Arg Lys Val Val Ser
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18

                        340   345   350

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Val Gly Ala Ala Leu Phe Leu Phe Gln Gln Met Ala Gly Ile Asn Ala
5   355   360   365

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Val Val Tyr Tyr Ser Thr Ser Val Phe Arg Ser Ala Gly Ile Ala Ser
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gat gtt gcc gct agt gcc ctt gtt gga gca tca aat gtt att ggc act   1260
Asp Val Ala Ala Ser Ala Leu Val Gly Ala Ser Asn Val Ile Gly Thr
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15 gct gtc gcc tct tct tta atg gac aag caa gga aga aag agc cta ctg   1308
Ala Val Ala Ser Ser Leu Met Asp Lys Gln Gly Arg Lys Ser Leu Leu
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20 Met Thr Ser Phe Ser Gly Met Ala Ala Ser Met Leu Leu Leu Ser Leu
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Ser Phe Thr Trp Lys Ala Leu Ala Pro Tyr Ser Gly Thr Leu Ala Val
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gtt cct gct ctt cta ctt cca gag atc ttc gca tcc aga atc cga gca   1500
Val Pro Ala Leu Leu Leu Pro Glu Ile Phe Ala Ser Arg Ile Arg Ala
465   470   475   480

35 aaa gca gtg gct ttg tca ctg gga atg cat tgg gcg tca aac ttc gta   1548
Lys Ala Val Ala Leu Ser Leu Gly Met His Trp Ala Ser Asn Phe Val
                  485   490   495

19

att ggc ctt tat ttc tta agt gtg gtg acc aag ttt gga atc agc aaa   1596
Ile Gly Leu Tyr Phe Leu Ser Val Val Thr Lys Phe Gly Ile Ser Lys
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gtg tat ttg ggg ttc gcg tca gtg tgt gtg ctt gcc gtg ttg tac ata   1644
Val Tyr Leu Gly Phe Ala Ser Val Cys Val Leu Ala Val Leu Tyr Ile
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gct ggt aac gtt gtt gaa aca aaa gga cga tca ctt gag gaa ata gag   1692
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ctt gct cta agt cca gct gtt tag tttggaggat acagtttttc tgtttttttg   1746
Leu Ala Leu Ser Pro Ala Val
545   550

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    1   5   10   15

Gln Asn Arg Arg Val Ala Gly Leu Ala Gly Leu Lys Gly Leu Ser Ser
            20   25   30

Ile Arg Ser Asn Asn Leu Ser Phe Val Asn Val Asn Asp Asn Asn Tyr
            35   40   45

Lys Ser Asn Pro Cys Lys Leu Ser Cys Gly Ser Leu Ser Met Gly Ala
            50   55   60

Gly Phe Ala Arg Leu Gly Leu Asp His Val Met Lys Ser Ser Pro Lys
65   70   75   80

5 Tyr Arg Ser Val Lys Ala Gln Ala Ala Ser Gly Gly Asp Leu Glu Asp
85   90   95

Ala Thr Pro Val Lys Tyr Gln Gly Lys Ser Ser Ala Ser Val Leu Pro
100   105   110

10

Tyr Val Gly Val Ala Cys Leu Gly Ala Ile Leu Phe Gly Tyr His Leu
115   120   125

Gly Val Val Asn Gly Ala Leu Asp Tyr Leu Ser Ala Asp Leu Ala Ile
15 130   135   140

Ala Gly Asn Thr Val Leu Gln Gly Trp Val Val Ser Ile Leu Leu Ala
145   150   155   160

20 Gly Ala Thr Val Gly Ser Phe Thr Gly Gly Ser Leu Ala Asp Lys Phe
165   170   175

Gly Arg Thr Lys Thr Phe Gln Leu Asp Ala Ile Pro Leu Ala Ile Gly
180   185   190

25

Ala Tyr Leu Cys Ala Thr Ala Gln Asn Val Gln Ile Met Met Ile Gly
195   200   205

Arg Leu Leu Cys Gly Ile Gly Ile Gly Ile Ser Ser Ala Leu Val Pro
30 210   215   220

Leu Tyr Ile Ser Glu Ile Ser Pro Thr Glu Ile Arg Gly Ala Leu Gly
225   230   235   240

35 Ser Val Asn Gln Leu Phe Ile Cys Ile Gly Ile Leu Ala Ala Leu Val
245   250   255

Ala Gly Leu Pro Leu Ala Gly Asn Pro Leu Trp Trp Arg Thr Met Phe

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Gly Ile Ala Thr Val Pro Ser Val Leu Leu Ala Leu Gly Met Gly Phe
    275   280   285

5

Cys Pro Glu Ser Pro Arg Trp Leu Phe Gln Gln Gly Lys Ile Val Glu
   290   295   300

Ala Glu Lys Ala Val Ala Ala Leu Tyr Gly Lys Glu Arg Val Pro Glu
10 305   310   315   320

Val Ile Asn Asp Leu Arg Ala Ser Val Gln Gly Ser Ser Glu Pro Glu
      325   330   335

15 Ala Gly Trp Phe Asp Leu Phe Ser Ser Arg Tyr Arg Lys Val Val Ser
    340   345   350

Val Gly Ala Ala Leu Phe Leu Phe Gln Gln Met Ala Gly Ile Asn Ala
    355   360   365
20

Val Val Tyr Tyr Ser Thr Ser Val Phe Arg Ser Ala Gly Ile Ala Ser
    370   375   380

Asp Val Ala Ala Ser Ala Leu Val Gly Ala Ser Asn Val Ile Gly Thr
25 385   390   395   400

Ala Val Ala Ser Ser Leu Met Asp Lys Gln Gly Arg Lys Ser Leu Leu
      405   410   415

30 Met Thr Ser Phe Ser Gly Met Ala Ala Ser Met Leu Leu Leu Ser Leu
    420   425   430

Ser Phe Thr Trp Lys Ala Leu Ala Pro Tyr Ser Gly Thr Leu Ala Val
    435   440   445
35

Val Gly Thr Val Leu Tyr Val Leu Ser Phe Ser Leu Gly Ala Gly Pro
    450   455   460

Val Pro Ala Leu Leu Leu Pro Glu Ile Phe Ala Ser Arg Ile Arg Ala
465   470   475   480

Lys Ala Val Ala Leu Ser Leu Gly Met His Trp Ala Ser Asn Phe Val
5   485   490   495

Ile Gly Leu Tyr Phe Leu Ser Val Val Thr Lys Phe Gly Ile Ser Lys
          500   505   510

10 Val Tyr Leu Gly Phe Ala Ser Val Cys Val Leu Ala Val Leu Tyr Ile
          515   520   525

Ala Gly Asn Val Val Glu Thr Lys Gly Arg Ser Leu Glu Glu Ile Glu
          530   535   540

15

Leu Ala Leu Ser Pro Ala Val
545   550